

TABLE OF CONTENTS

List of Chapters	Page
Executive Summary	ES-1
List of Chapters	i
List of Figures	iv
List of Tables	v
Acronyms and Abbreviations	vi
Chapter 1 - Introduction	1-1
1.1 Study Scope and Area	1-1
1.2 Study Authority	1-1
1.3 Purpose and Need	1-5
1.4 National Environmental Policy Act Requirements	1-7
1.5 Public Concerns	1-9
1.6 Study Objectives	1-9
Chapter 2 - Proposed Action and Alternatives	2-1
2.1 No Action Alternative	2-1
2.2 Proposed Action	2-3
2.2.1 Flood Damage Reduction Alternatives	2-4
2.2.2 Ecosystem Restoration Alternatives	2-8
Chapter 3 - Existing Environment	3-1
3.1 Study Area	3-1
3.2 Existing Resources	3-1
3.2.1 Land Use	3-1
3.2.2 Socioeconomic Setting	3-2
3.2.3 Physiography	3-14
3.2.4 Geology	3-30
3.2.5 Climatology	3-33
3.2.6 Hydraulics and Hydrology	3-34
3.2.7 Vegetational Areas and Soils	3-39
3.2.8 Wildlife Resources	3-62
3.2.9 Freshwater Resources	3-75
3.2.10 Wetlands	3-86
3.2.11 Marine Resources Including Essential Fish Habitat	3-89
3.2.12 Water and Sediment Quality	3-94
3.2.13 Threatened and Endangered Species	3-102
3.2.14 Air Quality	3-109
3.2.15 Cultural Resources	3-112
3.2.16 Recreation and Open Space	3-112
3.2.17 Hazardous, Toxic, and Radioactive Waste	3-118
3.2.18 Environmental Justice	3-122
Chapter 4 - Environmental Consequences	4-1
4.1 Effects of Proposed Actions	4-1
4.1.1 Land Use	4-3

TABLE OF CONTENTS

List of Chapters	Page
4.1.2 Socioeconomics	4-6
4.1.3 Hydraulics and Hyrdology	4-7
4.1.4 Floodplains	4-10
4.1.5 Vegetational Areas and Soils	4-12
4.1.6 Wildlife Resources	4-15
4.1.7 Freshwater Resources	4-18
4.1.8 Wetlands	4-20
4.1.9 Marine Resources Including Essential Fish Habitat	4-22
4.1.10 Water and Sediment Quality	4-24
4.1.11 Threatened and Endangered Species	4-25
4.1.12 Air Quality	4-28
4.1.13 Cultural Resources	4-29
4.1.14 Recreation and Open Space	4-30
4.1.15 Hazardous, Toxic, and Radioactive Waste	4-31
4.1.16 Environmental Justice	4-33
 Chapter 5 - Cumulative Effects	 5-1
5.1 Past Actions	5-2
5.1.1 USACE Projects in the Study Area	5-2
5.1.2 Projects of Others in the Study Area	5-8
5.2 Reasonably Forseeable Future USACE Actions in the Study Area	5-16
5.3 Reasonably Forseeable Actions of Others in the Study Area	5-20
5.4 Cumulative Effects by Resource	5-29
5.4.1 Land Use	5-31
5.4.2 Socioeconomics	5-31
5.4.3 Hydraulics and Hydrology	5-35
5.4.4 Floodplains	5-36
5.4.5 Vegetation Areas and Soils	5-36
5.4.6 Wildlife Resources	5-37
5.4.7 Freshwater Resources	5-38
5.4.8 Wetlands	5-39
5.4.9 Marine Resources Including Essential Fish Habitat	5-39
5.4.10 Water and Sediment Quality	5-41
5.4.11 Threatened and Endangered Species	5-41
5.4.12 Air Quality	5-44
5.4.13 Cultural Resources	5-45
5.4.14 Recreation and Open Spaces	5-46
5.4.15 Hazardous, Toxic, and Radioactive Waste	5-46
5.4.16 Environmental Justice	5-46
 Chapter 6 - Environmental Compliance	 6-1
6.1 Endangered Species Act	6-1
6.2 Migratory Bird Treaty Act	6-1
6.3 Executive Order 11988	6-2
6.4 Section 202 (c) of the Water Resources Development Act of 1996	6-2

TABLE OF CONTENTS

List of Chapters	Page
6.5 Section 176 (c) Clean Air Act	6-3
6.6 Section 404 Clean Water Act	6-3
6.7 Sections 9 and 10 Rivers and Harbors Act	6-3
6.8 Executive Order 11990 – Protection of Wetlands	6-3
6.9 Executive Order 13112 – Invasive Species	6-4
6.10 Section 106 of the National Historic Preservation Act	6-4
6.11 Fish and Wildlife Coordination Act	6-4
6.12 USACE Habitat Mitigation Process	6-5
6.13 Coastal Zone Management Act of 1972 – Texas Coastal Management Plan	6-5
6.14 Advisory Circular – Hazardous Wildlife Attractants on or Near Airports	6-5
 Chapter 7 - Conclusions and Recommendations	 7-1
 Chapter 8 - Public Involvement / Agency Coordination	 8-1
8.1 Public Scoping Meetings	8-1
8.2 Public Comments	8-2
8.3 Agency Scoping and Coordination	8-3
 Chapter 9 - List of Preparers	 9-1
 Chapter 10 - References	 10-1
 Appendix 1 - Public Involvement Information	
 Appendix 2 - Socioeconomic Information	
 Appendix 3 - Endangered and Threatened Species Information	

TABLE OF CONTENTS

List of Figures	Page
Figure 1-1 Lower Colorado River Basin Study Area	1-3
Figure 3-1 Lower Colorado River Basin Study Area	3-3
Figure 3-2 Land Use for the Lower Colorado River Basin	3-5
Figure 3-3 Texas Comptroller of Public Accounts Economic Regions	3-7
Figure 3-4 Employment Sectors	3-9
Figure 3-5 2001 Unemployment Rates	3-15
Figure 3-6 Average Annual Growth Rate from 1970-2000	3-17
Figure 3-7 Average Annual Growth Rate from 2000-2030 (projected)	3-19
Figure 3-8 2000 Personal Income	3-21
Figure 3-9 2000 Average Per Capita Income	3-23
Figure 3-10 1999 Poverty Rates	3-25
Figure 3-11 Physiographic Provinces of Texas	3-27
Figure 3-12 Natural Regions	3-47
Figure 3-13 Vegetation Cover Types	3-49
Figure 3-14 Mouth of the Lower Colorado River	3-91
Figure 3-15 Major Aquifers of Texas	3-99
Figure 3-16 Minor Aquifers Within Study Area	3-103
Figure 3-17 Nonattainment Areas of Texas	3-113
Figure 3-18 Superfund and Hazardous Waste Sites	3-119
Figure 5-1 Past Actions - USACE Projects	5-3
Figure 5-2 Projects by Others in the Study Area	5-9
Figure 5-3 LCRA Irrigation System Service Area	5-13
Figure 5-4 Reasonably Foreseeable Future USACE Projects	5-17
Figure 5-5 Potential Trans Texas Corridors	5-29

TABLE OF CONTENTS

List of Tables	Page
Table 3-1	Existing Reservoirs 3-35
Table 3-2	Summary and Comparison of 100-Year Flood Peak Discharges (cfs) 3-37
Table 3-3	Summary and Comparison of 100-Year Peak Flood Elevations 3-38
Table 3-4	Total Structural and Contents Value Within Floodplains of the Highlands Reach 3-40
Table 3-5	Total Structural and Contents Value Within Floodplains of the Central Reach .. 3-42
Table 3-6	Total Structural and Contents Value Within Floodplains of the Coastal Reach .. 3-44
Table 3-7	Total Vehicle Value Within 1000-Year (.1%) Floodplain 3-46
Table 3-8	Vegetational Types Within the Lower Colorado River Basin 3-51
Table 3-9	Natural Resources Conservation Service, Noxious Plants of Texas 3-63
Table 3-10	Federal, State, and LCRA Lands in the Lower Colorado River Basin 3-64
Table 3-11	Freshwater Fishes Reported from the Colorado River System 3-77
Table 3-12	Instream Flows of the Lower Colorado River 3-87
Table 3-13	Recommended Target and Critical Freshwater Inflow Needs 3-94
Table 3-14	Federally Endangered, Threatened, and Candidate Species Regularly Occurring Within the Lower Colorado River Basin 3-106
Table 3-15	Air Pollution Concentrations Required to Exceed the NAAQS 3-110
Table 3-16	State and Federal Recreation Areas Within the Lower Colorado River Basin .. 3-116
Table 3-17	Existing Lower Colorado River Authority Facilities by County 3-117
Table 5-1	Projects Proposed by City of Austin Within the Study Area 5-21
Table 5-2	Projects Proposed by TxDot Within the Study Area 5-27
Table 5-3	Summary of Cumulative Impacts by Resource 5-31

ACRONYMS AND ABBREVIATIONS

BEG	Bureau of Economic Geology
BMP	Best Management Practice
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensations, and Liability Information System
CEQ	Council on Environmental Quality
cfs	cubic feet per second
CO	carbon monoxide
CO ₂	carbon dioxide
CFR	Code of Federal Regulations
DPEIS	Draft Programmatic Environmental Impact Statement
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FPPA	Farmland Protection Policy Act
GIS	Geographical Information System
GIWW	Gulf Intracoastal Waterway
gpm	gallons per minute
HTRW	Hazardous, Toxic, and Radioactive Waste
LBJ	Lyndon B. Johnson
LCRA	Lower Colorado River Authority
LCRBS	Lower Colorado River Basin Study
LCRWPG	Lower Colorado Regional Water Planning Group
LU/LC	Land Use/ Land Cover
mg/l	milligrams per liter
mlw	mean low water

MSA	Metropolitan Statistical Area
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NAVD	North American Vertical Datum
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NO ₂	nitrogen dioxide
NO _x	nitrogen oxide
NOI	Notice of Intent
NPL	National Priority List
NRCS	Natural Resources Conservation Service (formerly the Soil Conservation Service)
NRHP	National Register of Historic Places
O ₃	Ozone
OAQPS	Office of Air Quality Planning and Standards
OCIFS	Onion Creek Interim Feasibility Study
OSHA	Occupational Safety and Health Administration
PEIS	Programmatic Environmental Impact Statement
PM	particulate matter
PM10	particulate matter with a diameter less than 10 microns
PM2.5	particulate matter with a diameter less than 2.5 microns
ppb	parts per billion
ppm	parts per million
RADINFO	Radiation Information Database
RAD-NESHAP	Radioactive-National Emissions Standards for Hazardous Air Pollutants
RCRAInfo	Resource Conservation and Recovery Act Information
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service (Now the Natural Resources Conservation Service)
SHPO	State Historic Preservation Office
SO ₂	sulfur dioxide
TARL	Texas Archeological Research Laboratory

TCEQ	Texas Commission on Environmental Quality
TCPA	Texas Comptroller of Public Accounts
TCRFC	Texas Colorado River Floodplain Coalition
TMDL	Total Maximum Daily Load
TRI	Toxic Release Inventory
TSCA	Toxic Substance Control Act
TPWD	Texas Parks and Wildlife Department
TWDB	Texas Water Development Board
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
WMA	Wildlife Management Area